

## REMARKS

Reconsideration is respectfully solicited.

Applicants respectfully traverse the rejections at issue. Applicants deal first with the rejections under 35 U.S.C. 103(a) of claims previously considered as well as the amended claims in this paper. Applicants respectfully traverse the rejections of the claims under 35 U.S.C. 103(a) over German Patent No. DE 4100645 (Regler) which discloses a composition for the purification of gas.

In Applicants' view, the reference commends to the person of Section 103(a) inclusion of a reagent which is expressly eliminated from Claims 1 and 12. [As noted in a previous response, PTO policy as expressed in the MPEP, Section 2111.03, the phrase "consisting essentially of" is construed to limits the scope of a claim to the specified materials and "those materials that do not materially affect the basic and novel characteristic(s)" of the claimed invention . In re Herz (citation omitted).] Elimination of an element suggested in the prior art with improved results in an area unsuggested by the prior art is the epitome of non-obviousness. Please see the cases, In re Anthony 64 USPQ 553 at 555-556 (CCPA 1945); In re Miller 94 USPQ 88 (CCPA 1952) ;In re Fleissner, 121 USPQ270 (CCPA 1959).

## THE INVENTION

The invention concerns a solid pulverulent reactive composition for gas purification process.

The invention addresses the problem of agglutination of such compositions ("tendency to cake of the sodium bicarbonate").

In the prior art this problem is usually solved by the addition of silica.

The inventors have discovered that the silica negatively affects the effectiveness of the gas cleaning process, in particular when the removal of dust is carried out by means of a filter cloth (Please see the specification at p.5, 1. 24-34). The inventors believe that the silica-free compositions adhere better to the filter cloth than the silica-comprising compositions. On the other hand, the caking inhibition effect of lignite coke and/or selected magnesium compounds has proven successful.

Moreover, according to a specially recommended embodiment of the invention, which adheres well to the filter, the composition is characterized by a fine mean particle size of less than  $50\mu$  and a narrow particle size distribution (slope of less than 5) (see description p.3, 1.19 – p.4, 1.4).

Such particle sizes can be obtained by milling commercial sodium bicarbonate (see example 1). Amended claim 1 incorporates the characteristics of particle size: “*said composition exhibiting a mean particle size of less than  $50\mu$  and a particle size slope of less than 5.*” The particular particle sizes of the composition according to new claim 1, in conjunction with the new caking inhibitor and the absence of silica, have proven to be particularly effective, as demonstrated by the examples of the patent application.

Such a composition is not suggested by DE4100645.

The particle sizes according to claim 1 are neither inherently disclosed by Regler, because such particle sizes are not those of standard sodium bicarbonate but require additional treatment, for instance milling and sieving, as described in example 1.

Applicants’ Belgian representative further submits that sodium bicarbonate for flue gas treatment having fine particle size and narrow distribution is the object of patents US 6171567 (see abstract) and DE 69501113 from the same inventor (N. Fagiolini) and having priority date 1994 (Regler filing date is 1991).

Moreover DE 4100645 does not concern the caking problem of sodium carbonate and the complex interaction between additives and particle sizes.

Applicants respectfully traverse the rejections of the claims under 35 U.S.C. 103(a) over German Patent No. DE 4100645 (Regler) which discloses a composition for the purification of gas. The title of this reference is “*Waste gas purificn. With nitrogen basic cpds. Removing acid cpds. – by adding ammonia and alkali and/or alkaline earth cpds., for foundry, alkali chloride electrolysis, blast furnace, power station, refuse and glass industry.*” In general the composition comprises:

- A basic alkaline and /or alkaline earth substance;
- A basic compound comprising nitrogen for absorption of NO<sub>x</sub>;
- An additive with large specific area, including explicitly silica to absorb certain impurities and improving the reactivity with the gas.

More specifically, the Abstract of the reference recites

“Nitrogen bases (IA) are injected above the dw pt. Of H<sub>2</sub> in addn. to basic alkali and/or alkaline earth cpds. (IB), mixed with the gas stream and reacted and the solids are sepd. In dust separators. Zeolites are used as surfactant (II) together with (IB). Pref. (IA) is NH<sub>3</sub>, ammonium salts, e.g. NH<sub>4</sub>Cl, urea and/or prim., sec. and/or tert. Amines, (NH<sub>3</sub> gas) (B) is NaOH, KOH, NaHCO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>, KHCO<sub>3</sub>, K<sub>2</sub>CO<sub>3</sub>, quicklime, Ca(OH)<sub>2</sub>, limestone, MgO, Mg(OH)<sub>2</sub> and/or MgCO<sub>3</sub>, as solid, soln. or suspension. (IB) may be mixed with (II) content of the (IB)/(II) mixt. Is 0.1-95,(0.5-50) esp. 1-10%.”

Applicants’ composition is non obvious for the following reasons:

1. Applicants’ invention is intended to solve an agglutination problem (the composition is a caking inhibitor-see claim 1-). **Regler does not mention nor suggest an agglutination problem.** As a consequence, after reading the DE

4100645 document, a person skilled in the art would not make, among Regler's numerous compositions, the very particular selection which solves a problem not even mentioned in the document;

2. In order to reconstitute Applicants' invention from DE 4100645 document, a person skilled in the art must operate successive selections
3. Regler's composition can contain silica (silica is explicitly mentioned among the possible compositions), whereas the Applicants have discovered the negative effect of silica for the agglutination problem. Specifically, Applicants' claims recite that the composition is substantially devoid of silica.

It is believed that the formal rejections are now moot, in view of the amendment herein. Reconsideration and an early allowance are respectfully solicited. Should an interview (personal or telephonic) resolve any minor outstanding issue(s), the Examiner is respectfully solicited to call the undersigned.

Withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully solicited.

Date

*April 12 2002*

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## APPENDIX

### MARKED UP VERSION OF AMENDMENTS IN THE SPECIFICATION

1. (Four times Amended) Solid pulverulent reactive composition for the purification of a gas, comprising sodium bicarbonate and a caking inhibitor for sodium bicarbonate and being devoid of silica, said inhibitor comprising lignite coke and/or a magnesium compound selected from the group consisting of magnesium oxide, magnesium hydroxide, mixtures of magnesium oxide and magnesium hydroxide and magnesium hydroxycarbonate, wherein said composition exhibiting a mean particle size of less than 50 $\mu$  and a particle size slope of less than 5.

12. (Amended) A non-caking solid pulverulent reactive composition for the purification of a gas containing HCl, HF, sulfur oxide, nitrogen oxide, dioxins, furans, and admixtures thereof, consisting essentially of

sodium bicarbonate and

a caking inhibitor for sodium bicarbonate,

said inhibitor is selected from the group consisting of lignite coke, a magnesium compound and admixtures thereof, wherein said magnesium compound is selected from the group consisting of magnesium oxide, magnesium hydroxide, mixtures of magnesium oxide and magnesium hydroxide and magnesium hydroxycarbonate;  
wherein said composition is devoid of silica [which interferes with said purification].